

PhD project: Exploitation of street canyon observations for inner city air quality forecasts and emission optimization

The Helmholtz School for Data Science in Life, Earth and Energy (HDS-LEE) provides an interdisciplinary environment for educating the next generation of data scientists in close contact to domain-specific knowledge and research. All three domains – life & medical sciences, earth sciences, and energy systems/materials – are characterized by the generation of huge heterogeneously structured data sets, which have to be evaluated in order to obtain a holistic understanding of very complex systems. Visit HDS-LEE at: www.hds-lee.de

As a member of the Helmholtz Association, Forschungszentrum Jülich makes an effective contribution to solving major challenges facing society in the fields of information, energy, and bioeconomy. It focuses on varied tasks in the area of research management and utilizes large, often unique, scientific infrastructures. Come and work with around 5,900 colleagues across a range of topics and disciplines at one of Europe's largest research centres.

This HDS-LEE PhD position will be located at the Institute of Energy and Climate Research: Troposphere (IEK-8) The IEK-8 investigates the chemical and physical processes in the troposphere that impact the chemical composition of the atmosphere. Find more Information about the IEK-8 here: www.fz-juelich.de/iek/iek-8/EN/ The candidate will be supervised by Prof. Dr. Astrid Kiendler-Scharr.

Your Job:

Local traffic emissions in urban areas provide the dominant share for city scale air pollution, while other contributions from adjacent regions may add substantially to background concentrations that need to be considered. On regional scales, the combination of atmospheric chemistry models with measurements by data assimilation is the standard technique to aid in improving atmospheric chemistry forecasts, and meanwhile even in emission source strength assessments.

The target of this PhD project focuses on the investigation of a prediction model for inner city air quality by data analytics methods, such as deep learning.

- The PhD candidate will develop, implement, and test data analytics methods (e. g. cluster analysis, support vector machines, deep learning) in order to derive inner city air quality forecasts from street canyon observations and regional scale air quality forecasts.
- The candidate must handle, merge and exploit large amounts of data from atmospheric transport models, observations and other valuable information.
- Urban pollution will be assessed and it will be merged with regional background pollution.
- The investigation of local traffic emission quantification will be a main contribution to this work.

Your profile

- M. Sc. degree in physics, mathematics, meteorology, or a related field
- Experiences in data science, big data analyses, or deep learning methods are of great advantage
- Good knowledge in software development using FORTRAN90 or Python
- Experiences on high performance computing (HPC)
- Strong interest in atmospheric physics and chemistry
- Good skills in the spoken and written English language: TOEFL or equivalent evidence of English-speaking skills
- You are convincing with your confident attitude and good communication skills
- Outstanding organizational skills and the ability to work independently
- Very good cooperation and communication skills and ability to work as part of a team in an international and interdisciplinary environment
- A high level of scholarship as indicated, for example, by bachelor and master study transcripts and two reference letters

Our offer

- Outstanding scientific and technical infrastructure – ideal conditions for successfully completing a doctoral degree
- Unique HDS-LEE graduate school program
- A highly motivated group as well as an international and interdisciplinary working environment at one of Europe's largest research establishments
- Chance of participating in (international) conferences
- Continuous scientific mentoring by your scientific advisor
- Further development of your personal strengths, e.g. via a comprehensive further training program
- Pay in line with 100 % of pay group 13 of the Collective Agreement for the Public Service (TVöD-Bund)
- A contract for the duration of 3 years

Forschungszentrum Jülich aims to employ more women in this area and therefore particularly welcomes applications from women.

We also welcome applications from disabled persons.

Become a part of HDS-LEE and apply at https://www.fz-juelich.de/SharedDocs/Stellenangebote/_common/dna/2019D-143-EN-IEK-8.html?nn=718260

Starting date: at the next possible date